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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ABDO ESMAIL ABDO, ROBERT JOSEPH BESTGEN, and
JOHN DAVID DIETEL

Appeal 2009-005536
Application 10/758,485
Technology Center 2100

Before: LANCE LEONARD BARRY, DEBRA K. STEPHENS, and
JAMES R. HUGHES, *Administrative Patent Judges*.

BARRY, *Administrative Patent Judge*.

DECISION ON APPEAL¹

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the "MAIL DATE" (paper delivery mode) or the "NOTIFICATION DATE" (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

STATEMENT OF THE CASE

The Patent Examiner rejected claims 1-19. The Appellants appeal therefrom under 35 U.S.C. § 134(a). We have jurisdiction under 35 U.S.C. § 6(b).

INVENTION

The Appellants describe the invention at issue on appeal as follows.

A relational database system analyzes each potential join in a query, to determine whether a relation involved in the join is subject to a selection criterion, and evaluate whether that selection criterion or the join per se effects a join reduction. The computational expense of generating a look-ahead predicate comprising the tuples of the second relation matching any applicable selection criterion, is compared to the computational savings that result from the join reduction. The most beneficial look-ahead predicate among all potential joins of relations in the query is identified through iterative analysis of all possible joins. Thereafter, membership in the look-ahead predicate is added as a selection criterion on the first relation, and further iterative analysis is performed of all possible joins of the remaining relations and the look-ahead predicate, to iteratively identify additional joins in the query that benefit from the formation of the look-ahead predicate, and potentially form further look-ahead predicates.

(Abstract.)

ILLUSTRATIVE CLAIM

1. A method of performing a query in a relational database system by operating upon a plurality of relations each comprising a plurality of tuples formed over a plurality of attributes, comprising:

evaluating join predicates in said query to determine whether a join involving a first relation and a second relation will be reductive of said first relation,

identifying a join involving said first and second relations that will be reductive of said first relation, and

performing said query by the prior application of a look-ahead predicate based upon the second relation in the join.²

REJECTIONS

Claims 17-19 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Claims 1-19 stand rejected under 35 U.S.C. § 112, ¶ 2, as being indefinite.

Claims 1-19 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,513,029 B1 ("Agrawal").

² Although the Appellants' claim appendix places the "identifying" and "performing" limitations into a single paragraph, these limitations have been placed into separate paragraphs herein for purposes of clarity.

REJECTION UNDER § 101

The *issue* before us is whether the Examiner erred in concluding that claims 17-19 are directed to non-statutory subject matter.

FINDINGS OF FACT

Claims 17-19 follow.

17. A program product comprising:

a relational database comprising one or more relations,
each relation comprising one or more tuples on one or more
attributes, and

relational database system adapted to perform a query on
said relational database by evaluating join predicates in said
query to determine whether a join involving a first relation and
a second relation will be reductive of said first relation, identify
a join involving said first and second relations that will be
reductive of said first relation, and perform said query by the
prior application of a look-ahead predicate based upon the
second relation in the join, and

signal bearing media bearing the relational database and
the relational database system.

18. The program product of claim 17 wherein the signal
bearing media comprises transmission media.

19. The program product of claim 17 wherein the signal
bearing media comprises recordable media.

ANALYSIS

"The four categories [of § 101] together describe the exclusive reach of patentable subject matter. If a claim covers material not found in any of the four statutory categories, that claim falls outside the plainly expressed scope of § 101 even if the subject matter is otherwise new and useful." *In re Nuijten*, 500 F.3d 1346, 1354 (Fed. Cir. 2007). A claim to a data structure per se is nonstatutory. *In re Warmerdam*, 33 F.3d 1354, 1360-61 (Fed. Cir. 1994). "Data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer." MPEP § 2106.01, heading I (8th ed., Rev. 6, Sept. 2007) (citing *Warmerdam*, 33 F.3d at 1361)." A transitory, propagating signal . . . is not a 'process, machine, manufacture, or composition of matter.' Those four categories define the explicit scope and reach of subject matter patentable under 35 U.S.C. § 101; thus, such a signal cannot be patentable subject matter." *In re Nuijten*, 500 F.3d 1346, 1357 (Fed. Cir. 2007).

Here, the Examiner makes the following specific and detailed findings and conclusions.

Claim 17 (which recites a "program comprising"), is directed to functional descriptive material per se.

Appellant should duly note that; (sic) both types of "descriptive material" are nonstatutory when claimed as descriptive material per se, 33 F.3d at 1360, 31 USPQ2d at 1759

Claims 18 and 19 fail to be limited to embodiments which fall within a statutory category. Particularly, the claims recite "the signal bearing media" (see also [0025] of the specification), which does not appear to be a process, machine, manufacture, or composition of matter. See, e.g., *In re Nuijten*,

Docket no. 2006-1371 (Fed. Cir. Sept. 20, 2007)(slip op. at 18)("A transitory, propagating signal like Nuijten's is not a process, machine, manufacture, or composition of matter.[] ... Thus, such a signal cannot be patentable subject matter.")
(Ans. 4-5.)

For their part, the Appellants fail to address the Examiner's findings and conclusions. In fact, the Appellants do not address the rejection under § 101 at all. "Silence implies assent." *Harper & Row Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 572 (1985). Therefore, we *conclude* that the Examiner did not err in concluding that claims 17-19 are directed to non-statutory subject matter.

REJECTION UNDER § 112, ¶ 2

Based on the Appellants' arguments, we will decide the appeal of claims 1-19 on the basis of claim 1 alone. See 37 C.F.R. § 41.37(c)(1)(vii). The *issue* before us is whether the Examiner erred in concluding that representative claim 1 is indefinite for reciting "the prior application."

FINDING OF FACT ("FF")

The Appellants are "open to amending this language, e.g. [sic], by the deletion of 'the' before 'prior', if the Examiner views a particular amendment as beneficial in overcoming this objection." (Appeal Br. 11.)

ANALYSIS

"The legal standard for definiteness is whether a claim reasonably apprises those of skill in the art of its scope." *In re Warmerdam*, 33 F.3d 1354, 1361 (Fed. Cir. 1994) (citing *Amgen Inc. v. Chugai Pharma. Co.*,

927 F.2d 1200, 1217 (Fed. Cir.1991)). A claim is indefinite "where the language 'said lever' appears in a dependent claim where no such 'lever' has been previously recited in a parent claim to that dependent claim" *Ex parte Moelands*, 3 USPQ2d 1474, 1476 (BPAI 1987).

Here, the Examiner makes the following findings. "Claim[] 1 . . . recite[s] the limitation 'the prior application.' There is insufficient antecedent basis for this limitation in the claim. It is unclear to the examiner which prior application the claims refer to, or whether 'the prior application' is before the 'evaluating...' step." (Ans. 5.)

For their part, the Appellants make the following argument.

[T]he Examiner is misreading the claim language; "the prior application" is not referring to any other language in the claim, but rather it is a description of the manner of performance of the query – the query is performed by prior, i.e., initial, application of a predicate that is based on the second relation in the join.

(Appeal Br. 11.)

It is uncontested that there is no antecedent basis for the limitation "the prior application" in representative claim 1. Moreover, the Appellants expressed willingness to amend the claim language "by the deletion of 'the' before 'prior'" (FF.)

We agree with the Examiner that it is unclear as to whether "the prior application" occurs before the "evaluating" step of claim 1. Furthermore, it is unclear to what claimed limitations the occurrence of the application is "prior." Therefore, we *conclude* that the Examiner did not err in concluding that representative claim 1 is indefinite for reciting "the prior application."

REJECTIONS UNDER § 102(e)

Based on the Appellants' arguments, we will decide the appeal of claims 1, 3-9, and 11-19 on the basis of claim 1 alone, and we will decide the appeal of claims 2 and 10 on the basis of claim 2 alone. *See* 37 C.F.R. § 41.37(c)(1)(vii). The *issues* before us are whether the Examiner erred in finding that (1) Agrawal teaches evaluating join predicates in a query "to determine whether a join involving a first relation and a second relation will be reductive of said first relation" and "performing said query by the prior application of a look-ahead predicate" as required by representative claim 1, and (2) Agrawal teaches evaluating whether a "selection criterion effects a join reduction" as required by representative claim 2.

FINDINGS OF FACT

Agrawal describes its invention as follows.

Candidate materialized views are obtained by first determining subsets of tables [that] are referenced in queries in the workload and then finding interesting table subsets. Next, interesting subsets are considered on a per query basis to determine which are syntactically relevant for a query. Materialized views which are likely to be used for the workload are then generated along with a set of merged materialized views.

(Abstract.)

Figure 6 of Agrawal follows.

```
601~ LET V1 AND V2 BE A PAIR OF MATERIALIZED VIEWS THAT REFERENCE THE  
SAME TABLES AND HAVE THE SAME WHERE CLAUSE  
602~ LET V BE A VIEW OBTAINED BY TAKING THE UNION OF THE PROJECTION  
COLUMNS OF V1 AND V2 AND UNION OF THE GROUP BY COLUMNS OF V1  
AND V2  
603~ IF (|V| > Max Size (Parent-Closure(V1) ∪ Parent-Closure(V2)) * x)  
RETURN NULL.  
601~ RETURN V.
```

FIG. 6

More specifically, Figure 6 is a "pseudocode representation of merging pairs of materialized views using a first rule." (Col. 4, ll. 14-15.)

ANALYSIS

We address the aforementioned issues *seriatim*.

Claim 1

"A reference anticipates a claim if it discloses the claimed invention 'such that a skilled artisan could take its teachings in combination with his own knowledge of the particular art and be in possession of the invention.'" *In re Graves*, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995) (quoting *In re LeGrice*, 301 F.2d 929, 936, 133 USPQ 365, 372 (CCPA 1962)). Of course, anticipation "is not an 'ipsissimis verbis' test." *In re Bond*, 910 F.2d 831, 832-33, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990)

(citing *Akzo N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1479 & n.11, 1 USPQ2d 1241, 1245 & n.11 (Fed. Cir. 1986)). "An anticipatory reference . . . need not duplicate word for word what is in the claims." *Standard Havens Prods. v. Gencor Indus.*, 953 F.2d 1360, 1369 (Fed. Cir. 1991).

Here, the Appellants present the following arguments.

[First,] there is nothing in Agrawal that relates to "performing a query" by "evaluating join predicates in [the] query", since at the time that Agrawal is identifying "materialized views" there is no query, only the hypothetical possibility of a future query for which a "materialized view" may be useful. The claim language, directed to actually "performing a query" and steps taken during performance of the query, thus is not and could not be anticipated by language regarding creation of an index or "materialized views" when there is not yet a query to be processed.

Second, Applicant notes that the creation of "materialized views" does not involve the claim steps, most particularly the claim step of determining whether a join will be reductive of a relation so that the query can be performed "by the prior application of a look-ahead predicate". There is simply no discussion in the Agrawal text . . . of the use of a look-ahead predicate

(Appeal Br. 13.)

The Examiner makes the following findings.

Agrawal clearly discloses that at the time of the step of identifying the materialized view there is a query (see for example; Fig. 2, items 215, 220, 225, Col. 6, lines 60-67, "One way to obtain such a workload is to use logging capabilities of modem (sic) database systems to capture a trace of queries... A syntactic structure selection module 220 or program receives the workload 215 as input. Given workload 215, syntactically relevant indexes, materialized

views are generated..."; note that the workload 215 occurs before the materialized view "220" and "235"; Col. 7, 1-10

(Ans. 11.) In other words, materialized views are generated from the captured trace of queries. Thus, a query is in existence at the time that Agrawal is identifying "materialized views".

The Examiner makes the following additional findings.

[T]he specification . . . defines the term "look-ahead predicate" as a selection based on the advance processing (See [0009] of the specification). Since Agrawal teaches estimating, simulating including "what if" materialized views, and further pre-computing portions of the query, then Agrawal teaches the use of a look-ahead predicate (advance procession) as claimed

(*Id.* at. 14.) We agree with the Examiner that these pre-computed portions of the query constitute the look-ahead predicate as required by representative claim 1.

Therefore, we conclude that the Examiner did not err in finding that Agrawal teaches evaluating join predicates in a query "to determine whether a join involving a first relation and a second relation will be reductive of said first relation" and "performing said query by the prior application of a look-ahead predicate" as required by representative claim 1.

Claim 2

Here, the Examiner makes the following "specific and detailed findings," *Ex parte Belinne*, 2009 WL 2477843, at *4 (BPAI Aug. 10, 2009) (informative), about Agrawal.

Agrawal discloses an apparatus wherein said processor determines whether a relation involved in the join is subject to a selection criterion (Fig. 9, items 902, and 903, Col. 16, lines 56-

62, Agrawal[]), and evaluates whether that selection criterion effects a join reduction (Fig. 9, item 904, and 905, Col. 17, lines 11-16, Agrawal).

(Ans. 7.)

The Appellants make the following argument.

[A]lthough the Examiner has identified mentions of selection criteria in Fig. 6 and [] col. 16, lines 49-55, these mentions do not refer to the evaluation of a particular query having a particular selection criterion therein. Claims 2 and 10, however, each refer to a second relation that is subject to a selection criterion, and recite "evaluating whether that selection criterion effects a join reduction[.]" This subject matter cannot be found in Agrawal. For this reason, Applicant (sic) submits that claims 2 and 10 are independently patentable from claims 1 and 9.

(Appeal Br. 14.)

However, the passages cited by the Appellants are not relevant to the issue at hand. The Appellants' argument "do[es] not . . . explain why the Examiner's explicit fact finding is in error." *Belinne*, 2009 WL 2477843, at *4. More specifically, the Appellants fail to address the passages relied on by the Examiner. For example, the Examiner cites col. 16, lines 59-62 of Agrawal which state that "[a]t 902, selection conditions that appear in a first parent view but not in a second are identified, as are selection conditions that appear in the second by (sic) not in the first." We agree with the Examiner that these selection conditions constitute the selection criterion set forth in representative claim 2. Therefore, we *conclude* that the Examiner did not err in finding that Agrawal teaches evaluating whether a "selection criterion effects a join reduction" as required by representative claim 2.

DECISION

We affirm the rejection of claims 17-19 under § 101. We affirm the rejection of claim 1 and that of claims 2-19, which fall therewith, under § 112, ¶ 2. We affirm the rejection of claim 1 and that of claims 3-9 and 11-19 which fall therewith, under § 102(e). We affirm the rejection of claim 2 and that of claim 10, which falls therewith, under § 102(e).

No time for taking any action connected with this appeal may be extended under 37 C.F.R. § 1.136(a)(1). *See* 37 C.F.R. § 1.136(a)(1)(v).

AFFIRMED

Tkl

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